



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT : Chishio HOSOKAWA et al.
SERIAL NO. : 10/814,121
FILED : APRIL 1, 2004
FOR : ORGANIC ELECTROLUMINESCENCE DEVICE
ART UNIT : 1774
EXAMINER : M. Yamnitzky

DECLARATION UNDER 37 CFR 1.132

Honorable Commissioner of Patents and Trademarks
Washington, D.C. 20231

Sir:

I, Chishio Hosokawa of c/o IDEMITSU KOSAN COMPANY LIMITED 1-1,
MARUNOUCHI 3-CHOME CHIYODA-KU TOKYO JAPAN, declare and state:

1. That I am a citizen of Japan.

That I received a master's degree in March, 1986 from Kyoto University,
Department of Physical Science and have been employed by IDEMITSU
KOSAN Co., Ltd. since April, 1986, where, I was engaged in research and
development of electroluminescence devices and materials at Central
Research Laboratory of IDEMITSU KOSAN Co., Ltd.

2. That I am one of the named inventors of the present U.S. Patent Application
as identified above and familiar with the subject matter disclosed in the
foregoing application.

3. That I have further reviewed the cited references of Onikubo et al. (US
6,280,859 or JP 10-251633) and Enokida et al. (JP 9-268284).

4. That I conducted the following Experiment:

Object of Experiment

In order to demonstrate the superiority of the present invention, I further declare and state:

Procedures of Experiment

In order to show superiority of the compound represented by the general formulas of the present invention, when used in an organic EL device, we conducted the following Comparative Experiments. Namely, the same procedures were repeated to prepare an organic EL devices, except using the compounds represented by the general formula [4] of the present invention, or the compounds having the same structure as in the general formula [4] except chrysene nucleus are replaced by another nucleus. The below conditions are adopted.

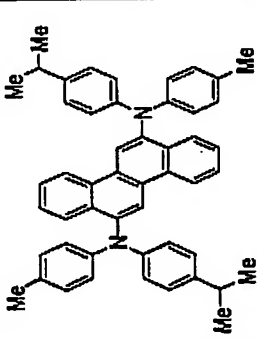
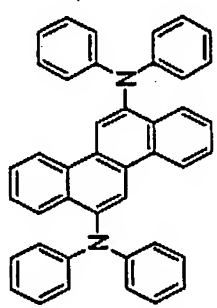
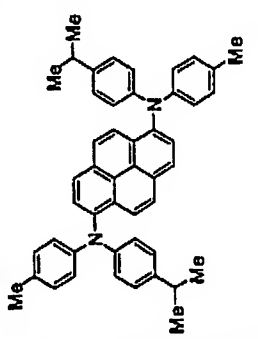
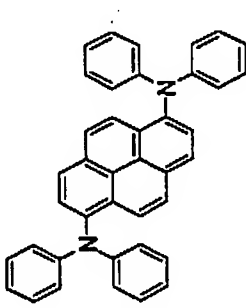
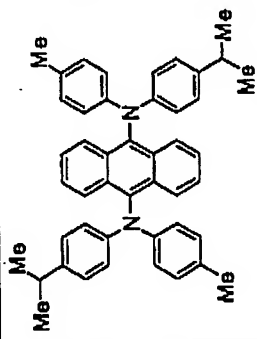
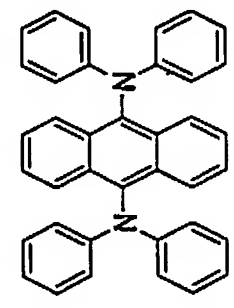
Conditions; Anode (Indium Tin Oxide) / Hole Injecting Layer (N,N'-bis[4-(diphenylamino) phenyl]-N,N'-diphenylbiphenyl-4,4'-diamine) / Hole Transporting Layer (N,N,N',N'-tetrakis(4-biphenyl)-4,4'-benzidine) / Light Emitting Layer (HOST(10,10'-bis[1,1',4',1'']terphenyl-2-yl-9,9'-bianthracene) : DOPANT) / Electron Injecting Layer (tris(8-hydroxyquinolato)aluminum) / Cathode (tris(8-hydroxyquinolato)aluminum) : Li/Al).

※Weight Ratio of Light Emitting Layer HOST : DOPANT = 40 : 2

Table1 shows the results of CIE chromaticity measured with respect to the organic EL devices thus prepared.

Results

Table 1

name	structure	CIE		name	structure	CIE	
		x	y			x	y
(A)		0.140	0.149	(A')		0.151	0.107
(B)		0.132	0.279	(B')		0.134	0.154
(C)		0.355	0.607	(C')		0.274	0.613

Consideration

In general, the shortened wave length make the blueness of light emission enhance with the fall of CIE (y) value in CIE chromaticity, and the color of light emission will be determined depending on the kind of condensed ring bonding in a diarylamino group. That is, the substituents located on the terminals of a diarylamino group will minutely control the color of light emission.

Table1 attached clearly shows that the compounds having chrysene nucleus [(A) and (A')] give smaller CIE (y) value and stronger blueness which is excellent as a dopant, as compared with the compounds having pyrene nucleus [(B) and (B')] or anthracene nucleus [(C) and (C')].

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Chishio Hosokawa
Chishio HOSOKAWA

Date: 18th Oct. 2004